

CITY OF REUBENS (PWS 2310006) SOURCE WATER ASSESSMENT FINAL REPORT

March 1, 2002



State of Idaho Department of Environmental Quality

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Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the Act. This assessment is based on a land use inventory of the designated source water assessment area and sensitivity factors associated with the well and aquifer characteristics.

This report, *Source Water Assessment for City of Reubens, Idaho*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The City of Reubens drinking water system consists of two active wells. Well #1 (the Steeple Well) has an automatic high susceptibility to inorganic contaminants (IOCs), synthetic organic contaminants (SOCs), and microbial contaminants due to the location of garden chemicals and cattle within 50 feet of the wellhead. It has a moderate susceptibility to volatile organic contaminants (VOCs). Well #2 (the Railroad Well) has an automatic high susceptibility to all potential contaminant categories due to the Camas Prairie Railnet that passes within 50 feet of the wellhead.

No current water chemistry issues affect the City of Reubens drinking water system. The IOCs barium, fluoride, and nitrate have been detected in the water system at levels below the maximum contaminant levels (MCLs). No VOCs, SOC or bacteria have been detected in the water system.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

For the City of Reubens, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system’s components and its capacity). Also, disinfection practices should be maintained if microbial contamination becomes a problem. Chemicals must not be stored or applied within the 50-foot radius of the wellhead. The garden chemicals and the cattle that are within 50 feet of Well #1 should be relocated to avoid contamination of the well. The City of Reubens may want to consider greater protection measures concerning Well #2 due to the Railnet that passes within 50 feet of the wellhead. As much of the designated protection areas are outside the direct jurisdiction of the City of Reubens, collaboration and partnerships with state and local agencies, and industry groups should be established and are critical to the success of drinking water protection. In addition, the well should maintain sanitary standards regarding wellhead protection.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results

in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineation encompasses urban and commercial land uses. Public education topics could include proper lawn and garden care practices, household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA.

A system must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Lewiston Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR CITY OF REUBENS, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the rankings of this assessment mean.** Maps showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are attached. The list of significant potential contaminant source categories and their rankings used to develop the assessment is also included.

Background

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

Level of Accuracy and Purpose of the Assessment

Since there are over 2,900 public water sources in Idaho, there is limited time and resources to accomplish the assessments. All assessments must be completed by May of 2003. An in-depth, site-specific investigation of each significant potential source of contamination is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The Idaho Department of Environmental Quality (DEQ) recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The local community, based on its own needs and limitations, should determine the decision as to the amount and types of information necessary to develop a drinking water protection program. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The public drinking water system for the City of Reubens is comprised of two ground water wells that serve approximately 70 people through 30 connections. Well #1 (the Steeple Well) is located on the south edge of town approximately 150 feet southeast of the Camas Prairie Railnet. Well #2 is located approximately 1000 feet northwest of Well #1 north of town approximately 45 feet from the Camas Prairie Railnet (Figure 1).

No current water chemistry issues affect the City of Reubens drinking water system. The IOCs barium, fluoride, and nitrate have been detected in the water system at levels below the MCLs. No VOCs, SOCs, or bacteria have been detected in the water system.

Defining the Zones of Contribution – Delineation

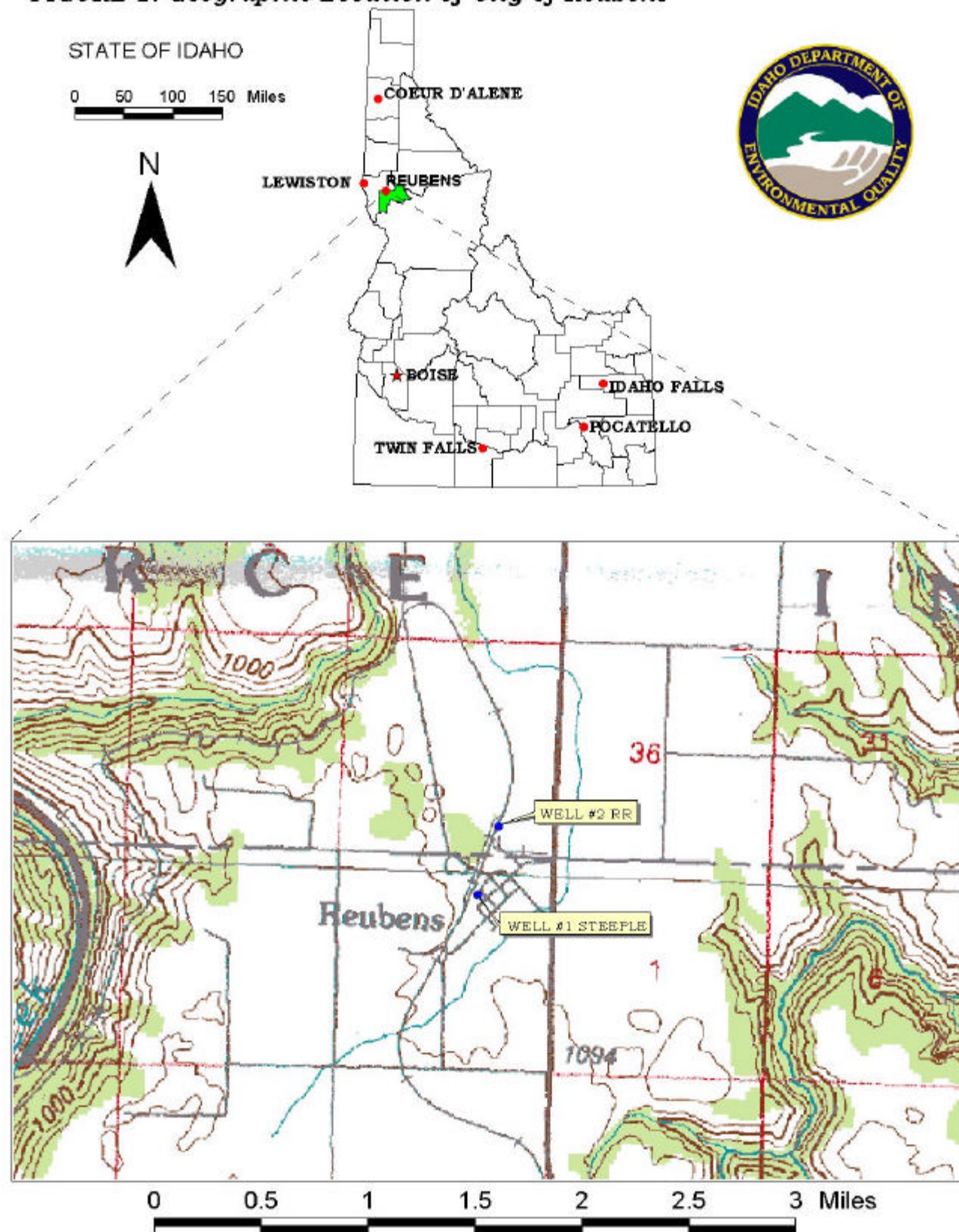
The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. DEQ contracted with the University of Idaho to perform the delineations using a refined computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the basalt aquifer of the Clearwater Plateau in the vicinity of the City of Reubens wells. The computer model used site specific data, assimilated by the University of Idaho from a variety of sources including operator input, local area well logs, and hydrogeologic reports (detailed below).

The conceptual hydrogeologic model for the area of the Reubens source wells is based on little known information and scarce data. Geologic maps at a scale of 1:250,000 are used to interpret the geology (Gaston and Bennett, 1979; Rember and Bennett, 1979). The Reubens source wells supply water to the Reubens community. Two nearby surface water bodies are thought to influence the ground water flow regime; these are the Lapwai Creek and Big Canyon Creek. Based on nearby well logs, the wells are located in fractured basalt. No well logs exist for the sources; information was gathered from IDEQ files and the system operator.

Wells located in basalt aquifers in northern Idaho produce up to 2,500 gpm. Discharge from the Reubens wells is about 55 gpm; however, the maximum potential discharge of the wells is unknown. Most of the ground water found in basalts lies in the vesicular contact, fracture zones or in the sediments between basalt flows. No static water level data exist for either well.

Grande Ronde basalt covers much of the Reubens area with small exposures of the Saddle Mountains basalt (Rember and Bennett, 1979). The source wells derive water from the fractured basalt aquifers. According to Morrison-Maierle, Inc., (1976) the general direction of ground water flow is to the northeast. Ground water flow, based on two test points, is to the north.

FIGURE 1. Geographic Location of City of Reubens



The geology of the Reubens area is complex. Based on the geologic maps by Rember and Bennett (1979) several structural features exist in the semi-far field area of Reubens. It is unknown whether these features are barriers to flow.

Headwaters of Lapwai Creek begin about 4 miles south of Winchester. The creek then downcuts through the basalt gaining water from the rock and discharges into the Clearwater. Lapwai Creek is thought to be a gaining creek for this reason and because it flows all year. If it were a losing creek it would be dry during the summer. Water in the creek during baseflow conditions is from ground water.

Big Canyon Creek is also thought to be a gaining creek because it flows all year. Headwaters of Big Canyon Creek begin about 5,600 meters southeast of Winchester. The creek then downcuts into the basalt and discharges into the Clearwater River to the north.

No aquifer recharge data are available for the Reubens area. In a study by Wyatt-Jaykim (1994) recharge to the central basin (Lewiston basin) was modeled as 1 inch/year; 2 inches/year was selected in the higher areas. Because the Reubens area lies at a much higher elevation than much of the basin, precipitation rates are much higher; the nearby towns of Nez Perce at 20 inches/year (Castelin, 1976) and Winchester State Park at 25 inches/year (Dorgan, 2001) versus 13 inches/year in Lewiston-Clarkston (Cohen and Ralston, 1980). Recharge is therefore expected to be greater.

The capture zone delineated herein is based upon limited data and must be taken as best estimates. If more data become available in the future this delineation should be adjusted based on additional modeling incorporating the new data.

The delineated source water assessment areas for the wells of the City of Reubens can best be described as corridors extending southwest for approximately 2 miles (Figure 2 and Figure 3). The delineated area for Well #2 splits at the point that the delineation crosses Well #1. This unusual delineation shape is due to well interference of Well #1 (Figure 3). The actual data used by the University of Idaho in determining the source water assessment delineation area is available from DEQ upon request.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of groundwater contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

Land use within the immediate area of the wells of the City of Reubens consists of mostly residential land and transportation uses while the surrounding area is predominantly agriculture.

It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be

Figure 2. City of Reubens Delineation Map and Potential Contaminant Source Locations

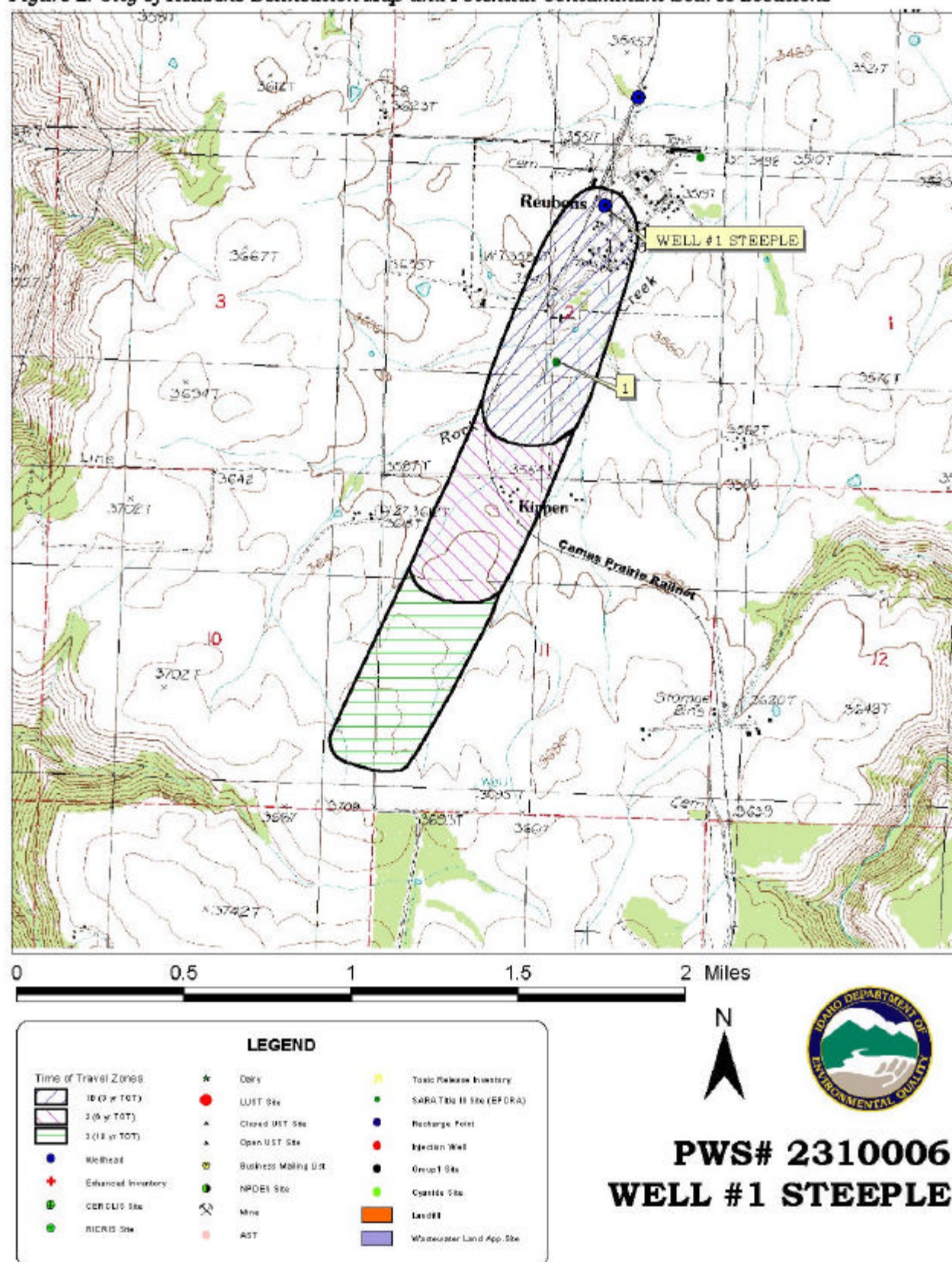
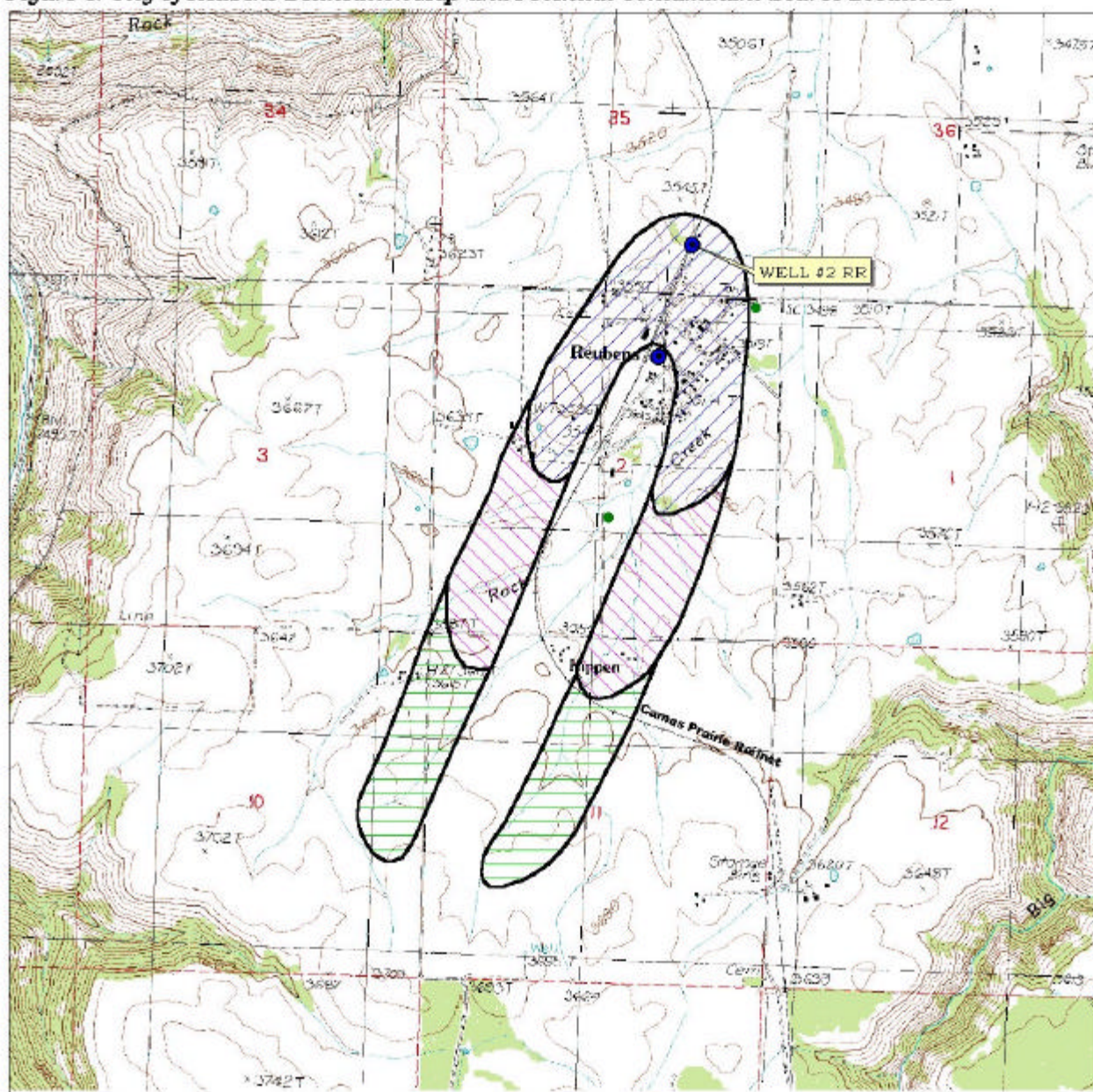


Figure 3. City of Reubens Delineation Map and Potential Contaminant Source Locations



0 0.5 1 1.5 2 Miles



PWS# 2310006
WELL #2 RR

interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, including educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted in October and November 2001. The first phase involved identifying and documenting potential contaminant sources within the City of Reubens source water assessment areas (Figure 2 and Figure 3) through the use of computer databases and Geographic Information System (GIS) maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to identify and add any additional potential sources in the area.

The delineated source water assessment areas of the City of Reubens wells contain the Camas Prairie Railnet (Table 1 and Table 2). This source can contribute leachable contaminants to the aquifer in the event of an accidental spill or release. Additionally, the 1993 Ground water under Direct Influence (GWUDI) field survey indicates that sewer lines are located within 200 feet and that garden chemicals and cattle are located within 50 feet of Well #1. Though these potential contaminant sources are not listed in Table 1 below, they were used in the susceptibility assessment of Well #1.

Table 1. City of Reubens Well #1, Potential Contaminant Inventory.

Site	Description of Source ¹	TOT ² Zone	Source of Information	Potential Contaminants ³
	Camas Prairie Railnet	0 – 6	GIS Map	IOC, VOC, SOC, Microbes

² TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead

³ IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Table 2. City of Reubens Well #2, Potential Contaminant Inventory.

Site	Description of Source ¹	TOT ² Zone	Source of Information	Potential Contaminants ³
	Camas Prairie Railnet	0 – 3	GIS Map	IOC, VOC, SOC, Microbes

² TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead

³ IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Section 3. Susceptibility Analyses

Each well's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Appendix A contains the susceptibility analysis worksheets for the system. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors: the surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone above the producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

Hydrologic sensitivity is moderate for both wells of the City of Reubens (Table 2). Regional soil data places the delineated areas within poor to moderately drained soils, which can decrease the potential downward migration of contaminants toward the aquifer. No well logs were available, preventing a determination of the composition of the vadose zones, the depths to first ground water, and the presence of 50-foot thick fine-grained zones above the producing zone of the well.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. If the wellhead and surface seal are maintained to standards, as outlined in sanitary surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then contamination from surface events is reduced. A sanitary survey was conducted in 2001 for the system.

The City of Reubens wells rated moderate for system construction. The 2001 sanitary survey indicates that the wellheads and surface seals are maintained and that both wells are properly protected from surface flooding. The well logs were unavailable, limiting the amount of well construction information for each well.

However, the sanitary survey did provide some details of the wells' construction. Well #1 was drilled in the 1920s to a depth of 467 feet. It has a 6-inch casing. Well #2 was drilled to a depth of 670 feet and has an 18-inch casing.

A determination was made as to whether current public water system (PWS) construction standards are being met. Though the well may have been in compliance with standards when it was completed, current PWS well construction standards are more stringent. The Idaho Department of Water Resources *Well Construction Standards Rules* (1993) require all PWSs to follow DEQ standards as well. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works* (1997) during construction. These standards include provisions for well screens, pumping tests, and casing thicknesses to name a few. Table 1 of the *Recommended Standards for Water Works* (1997) lists the required steel casing thickness for various diameter wells. Six-inch diameter wells require a 0.280-inch thick casing and 18-inch diameter wells require a 0.375-inch thick casing. As such, the wells were assessed an additional point in the system construction rating.

Potential Contaminant Source and Land Use

The wells of the City of Reubens both rated moderate for IOCs (i.e. nitrates, arsenic), VOCs (i.e. petroleum products, chlorinated solvents), and SOC (i.e. pesticides), and low for microbial contaminants (i.e. bacteria). The undetermined agricultural land surrounding the well and the limited number of potential contaminant sources within the delineations contributed to the land use scores.

Final Susceptibility Ranking

An IOC detection above a drinking water standard MCL, any detection of a VOC or SOC, or a detection of total coliform bacteria or fecal coliform bacteria at the wellhead will automatically give a high susceptibility rating to a well despite the land use of the area because a pathway for contamination already exists. Additionally, if there are contaminant sources located within 50 feet of the source then the wellhead will automatically get a high susceptibility rating. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0 to 3-year time of travel zone (Zone 1B) and agricultural land contribute greatly to the overall ranking. In terms of total susceptibility, Well #1 of the City of Reubens rates high susceptibility to IOCs, SOC and microbial contaminants and moderate susceptibility to VOCs. Well #2 rates high susceptibility to all potential contaminant categories.

Table 3. Summary of City of Reubens Susceptibility Evaluation

Well	Susceptibility Scores ¹									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #1	M	M	M	M	L	M	H* ²	M	H* ²	H* ²
Well #2	M	M	M	M	L	M	H* ³	H* ³	H* ³	H* ³

¹H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,

IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

²H* = Automatic high susceptibility due to the location of garden chemicals and cattle within 50 feet of Well #1

³H* = Automatic high susceptibility due to the location of the railroad within 50 feet of Well #2

Susceptibility Summary

Overall, Well #1 of the City of Reubens has a high susceptibility to IOCs, SOC and microbial contaminants and a moderate susceptibility to VOCs. Well #2 has a high susceptibility to all potential contaminant categories. The location of garden chemicals and cattle within 50 feet of Well #1 gave an automatic high susceptibility to IOCs, SOC, and microbial contaminants. The Camas Prairie Railnet passes within 50 feet of Well #2, giving a high susceptibility to all potential contaminant categories. The undetermined agricultural land that surrounds the wells also contributed to the final susceptibility scores.

No current water chemistry issues affect the City of Reubens drinking water system. The IOCs barium, fluoride, and nitrate have been detected in the water system at levels below the MCLs. No VOCs, SOC, or bacteria have been detected in the water system.

Section 4. Options for Drinking Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

For the City of Reubens, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey. Also, disinfection practices should be implemented if microbial contamination becomes a problem. Chemicals must not be stored or applied within the 50-foot radius of the wellhead. The garden chemicals and the cattle that are within 50 feet of Well #1 should be relocated to avoid contamination of the well. The City of Reubens may want to consider greater protection measures concerning Well #2 due to the Railnet that passes within 50 feet of the wellhead. As much of the designated protection areas are outside the direct jurisdiction of the City of Reubens, collaboration and partnerships with state and local agencies, and industry groups should be established and are critical to the success of drinking water protection. In addition, the well should maintain sanitary standards regarding wellhead protection.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineation encompasses urban and commercial land uses. Public education topics could include proper lawn and garden care practices, household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA.

A system must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Lewiston Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Lewiston Regional DEQ Office (208) 799-4370

State DEQ Office (208) 373-0502

Website: <http://www2.state.id.us/deq>

Water suppliers serving fewer than 10,000 persons may contact John Bokor, Idaho Rural Water Association, at 1-800-962-3257 for assistance with drinking water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY

LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as ASuperfund, is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100-year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5 mg/L.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

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Appendix A

City of Reubens
Susceptibility Analysis
Worksheets

The final scores for the susceptibility analysis were determined using the following formulas:

- 1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)
- 2) 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

1. System Construction		SCORE			
Drill Date	1/1/1920				
Driller Log Available	NO				
Sanitary Survey (if yes, indicate date of last survey)	YES	2001			
Well meets IDWR construction standards	NO	1			
Wellhead and surface seal maintained	YES	0			
Casing and annular seal extend to low permeability unit	NO	2			
Highest production 100 feet below static water level	NO	1			
Well located outside the 100 year flood plain	YES	0			
Total System Construction Score		4			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	YES	0			
Vadose zone composed of gravel, fractured rock or unknown	YES	1			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	NO	2			
Total Hydrologic Score		4			
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED PASTURE	1	1	1	1
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	YES	NO	YES	YES
Total Potential Contaminant Source/Land Use Score - Zone 1A		1	1	1	1
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	2	2	2	2
(Score = # Sources X 2) 8 Points Maximum		4	4	4	4
Sources of Class II or III leacheable contaminants or	YES	3	1	1	
4 Points Maximum		3	1	1	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B Greater Than 50% Non-Irrigated Agricultural		2	2	2	2
Total Potential Contaminant Source / Land Use Score - Zone 1B		9	7	7	6
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II Greater Than 50% Non-Irrigated Agricultural		1	1	1	
Potential Contaminant Source / Land Use Score - Zone II		4	4	4	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or	NO	0	0	0	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		0	0	0	0
Cumulative Potential Contaminant / Land Use Score		14	12	12	7
4. Final Susceptibility Source Score		11	10	10	11
5. Final Well Ranking		High	Moderate	High	High

1. System Construction		SCORE			
Drill Date	1/1/90				
Driller Log Available	NO				
Sanitary Survey (if yes, indicate date of last survey)	YES	2001			
Well meets IDWR construction standards	NO	1			
Wellhead and surface seal maintained	YES	0			
Casing and annular seal extend to low permeability unit	NO	2			
Highest production 100 feet below static water level	NO	1			
Well located outside the 100 year flood plain	YES	0			
Total System Construction Score		4			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	YES	0			
Vadose zone composed of gravel, fractured rock or unknown	YES	1			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	NO	2			
Total Hydrologic Score		4			
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED PASTURE	1	1	1	1
Farm chemical use high	NO	0	0	0	0
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	YES	YES	YES	YES
Total Potential Contaminant Source/Land Use Score - Zone 1A		1	1	1	1
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	1	1	1	1
(Score = # Sources X 2) 8 Points Maximum		2	2	2	2
Sources of Class II or III leacheable contaminants or	YES	3	1	1	
4 Points Maximum		3	1	1	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B Greater Than 50% Non-Irrigated Agricultural		2	2	2	2
Total Potential Contaminant Source / Land Use Score - Zone 1B		7	5	5	4
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II Greater Than 50% Non-Irrigated Agricultural		1	1	1	
Potential Contaminant Source / Land Use Score - Zone II		4	4	4	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		2	2	2	0
Cumulative Potential Contaminant / Land Use Score		14	12	12	5
4. Final Susceptibility Source Score		11	10	10	10
5. Final Well Ranking		High	High	High	High